

PISCES FY11 Research Highlight

Tritium accumulation within the ITER vessel is expected to be dominated by the codeposition of eroded plasma-facing materials (mainly beryllium) with the fuel species injected into the vessel. ITER has focused considerable effort into the ability to thermally remove tritium that may be codeposited in various regions in the device by the laborious process of baking the entire vessel. Another possible technique to mitigate tritium accumulation in these codeposited surfaces is the use of photonic flash heating of the first wall surface by radiatively terminating ITER discharges. The PISCES-B device at the University of California in San Diego has used a high power laser system to provide surface heating of beryllium codeposits to experimentally investigate the release of tritium during simulated radiative terminations of the ITER plasma. Unfortunately, the short (1-10 msec) timescale associated with radiative collapse of the ITER plasma has proven to be too short to release a significant amount of the tritium contained within the codeposited layer unless the heat pulse raises the surface temperature close to the melting threshold of the codeposit. While this release may occur during disruption avoidance by intentional mitigation of high-power ITER discharges, it does not appear to be a risk-free technique capable of being used on a routine basis to deplete the tritium inventory within codeposits formed during normal operation of the device. This work was funded in part by the OFES at DOE and in part by a direct contract with the ITER International Organization.